

## **EFFECT OF THE APPLICATION OF PIG SLURRY ON SOIL POLLUTION IN A MEDITERRANEAN CLIMATE.**

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### **EXTENDED ABSTRACT**

The recycling of pig slurry in agricultural soils is an alternative and valuable practice in countries such as Spain with significant European pig production (2.529 Million sows in 1998). From an agricultural perspective, the nitrogen content of the slurry needs to be determined to adopt ways of reducing its environmental impact. A further requisite, is to establish the available soil nitrogen including potentially mineralizable nitrogen. Besides, irrigation quantity needs to be adjusted to compensate for evapotranspiration losses and thus minimize water losses through drainage. In order to improve current knowledge and to provide recommendations for application dosage, a field study was performed with the aim of undertaking an environmental evaluation of pig slurry. In consequence, the agronomic effects of the application of pig slurry during two years of maize crop under conditions of forced irrigation and one year of barley (crop no requiring irrigation) were evaluated. The 0.2 ha experimental area, of typical xerofluent soil and of known vulnerability to nitrate contamination, was divided into 12 plots and provided with water measurement instruments (TDR-probes, vertical tensiometers and ceramic candle). Available N was estimated in the 12 plots before sowing and after harvesting the maize by determination of EUF-N fractions. The following fertilizer treatments were applied to triplicate plots: urea (U; 170 kg N ha<sup>-1</sup>), and an optimized (P1; 170 kg N ha<sup>-1</sup>) and triple (P3; 510 kg N ha<sup>-1</sup>) dose of pig slurry. Unfertilized plots (P0) served as controls. Leached nitrate and sodium were estimated by multiplying seasonal drainage by the corresponding nitrate and sodium concentration at a soil depth of 1.4 m. The triple dose of pig slurry induced nitrate losses that were 1.5 times higher than those related to optimized dose treatment (P1).

The mean total salt content of the soil solution was seen to increase with soil depth due to enhanced mobility and vertical translocation. Sodium concentration was also affected by the P3 dose, in accordance with its high concentration in the pig slurry. Salts that accumulate throughout the soil during the growing season can leach into the groundwater after the maize has been harvested, particularly during winters of high rainfall. This salt movement presents a pollution risk. The results suggest that the P3 treatment is highly contaminating due to the leaching of nitrates and increased soil salinity.

**Key words:** pig slurry, nitrate and sodium leaching